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obtained, the idea of preserving dried plants must have occurred to several botanists at the same time; and it seems to be useless to discuss at length the question as to whether the inventor of the forming of herbaria was Luca Ghini, as maintained by Meyer in his Geschichte der Botanik, or the Englishman Falconer, as thought by Messrs. Camus and Penzig. In fact, said Dr. Saint-Lager, the Lyonais surgeon Gréault formed a herbarium at the same period as did Ghini and Falconer, and without having been in communication with them. It is probable that other botanists likewise have simultaneously carried out the very legitimate desire of preserving in their library those plants which they had taken so much pleasure in gathering in a living state. The difficulty did not consist in conceiving of the idea of collecting dried and pressed plants together into a volume, for that is child's-play, but rather in finding a convenient and cheap mounting material.

Botanical Notes.

Red Snow.—At a recent meeting of the Biological Society of Washington, Mr. Romyn Hitchcock, of the National Museum, read a paper on Red Snow, and exhibited through the microscope specimens of the brilliant, minute, crimson globules which give color to the snow, and about the character of which there has been considerable difference of opinion among naturalists. Mr. Hitchcock remarked that the red snow that attracted much attention from scientific gentlemen when it was brought home from the Arctic regions by Capt. Ross, in the year 1818, was by no means unknown before that time. De Saussure, as early as 1760, observed it on Mount Breven, in Switzerland, and since then many others have noticed it in the Alps and Pyrenees, and it seems to occur frequently in all parts of the world. Particular interest, however, was manifested in the material brought home by Capt. Ross, and several botanists secured specimens for examination, and, among these, Mr. Francis Bauer, who thought the plant a *Uredo*, and named it *U. nivalis*. Baron Wrangel regarded the plant as a lichen, and gave it the name of *Lepraria Kermesina*.

In the latest literature of algæ the plant is classed as a *Chlamydococcus*. Until the method of propagation of this plant is more satisfactorily established, Mr. Hitchcock thinks it will be impossible to fix its systematic position. It is not improbable that in its actively vegetating condition the plant is green. This is indicated by the observations of early discoverers.

A specimen of the red snow collected by Dr. Kane from the crimson cliffs of Beverley is in the National Museum, but is now thoroughly dry.

A specimen sent by Mr. Alexander McDougall was received in January of this year from Poverty Gulch, Col.

Mr. Hitchcock made a few observations on this and attempted to cultivate some of the cells, but without success. The cells were of a bright red color, sometimes apparently quite naked, but frequently enclosed singly or three or more together, in a colorless, shrivelled envelope.

The contents of perfect and fresh cells appeared to be quite clear and transparent, with occasionally a well-defined sort of vesicle of a deeper color than the rest. When the endochrome was pressed out from the cells into the surrounding water it contracted into spherical, oil-like masses. The surrounding envelope was quite hard, tough and resisting.

Identification of Species by Cell-wall Markings.—Messrs. Lawrence and Raddin, of Evanston, Ill., have been making a study of the markings of the cell-walls of various exogenous trees with the object of ascertaining whether it is possible to distinguish species by this means. The results of their observations are published in the November number of the *Microscope.*

The conclusion that they reach is that species cannot be distinguished by this means, and they further observe that the same species collected in different localities presented differences that were oftentimes very great. They even assert that species of the same genus frequently bear no relation to each other in this respect, and that the markings on the cells of *Quercus rubra* sometimes so closely resemble those of *Pinus Strobus* that there is danger of confounding the woods of these two trees.

Vegetative Organs of Monotropa.—In studying the structure of *Monotropa Hypopitys*, Mr. F. Kamienski finds the root of this plant "to be covered externally by the mycelium of a fungus, which branches abundantly and forms a pseudoparenchymatous envelope, often two or three times the thickness of the epidermis itself, being especially well developed at the apex of the root. It is entirely superficial, not penetrating the living cells, though occasionally between the epidermal cells. The species of this fungus Mr. Kamienski was unable to determine, but considers it to be probably identical with that found on the roots of conifers and other trees. With regard to the mode of nutrition of *Monotropa*, Mr. Kamienski decides that it is not a parasite. The most careful examination failed to detect any haustoria or other parasitic union of the root with any "host." He regards it as deriving its nutriment from the soil through the medium of the fungus-mycelium by which the roots are invested; the only parts of the root which are in actual contact with the soil are composed of lifeless cells with no power of deriving nutriment from it. The connection of the fungus with the root of the *Monotropa* is not one of parasitism, but of true symbiosis, each of the two organisms deriving support and nutriment from the other.—*Journ. Roy. Microscop. Soc.*

The New Director of Kew Gardens—We supplement the statement made in our last number as to the retirement of Sir Joseph D. Hooker from the post of Director of the Royal Gardens at Kew by the announcement that Mr. W. T. Thiselton Dyer, who for some time past has ably performed the duties of Assistant Director, has been nominated to succeed him.

The de Candolle Prize.—The Society of Physics and Natural History of Geneva offers a prize of 500 francs for the best original monograph of any family or class of plants. The prize was instituted by Mr. A. P. de Candolle. The manuscripts may be in Latin, French, German, English, or Italian, and must reach the president of the society before the first of October, 1889. The members of the society are not allowed to compete.

New American Desmids.—In a paper read before the Royal Microscopical Society, Nov. 11th (*Journal* of the Society, pp. 933–40) Mr. W. B. Turner describes a number of desmids, of which the following new species and varieties are North American: *Genicularia Americana* (Minn.), *Leptozosma* * *catenula* (N. J.), *Onychonema Nordstedtiana*, *Cosmarium gemmatum* (Minn.), *C. rostratum* (Minn.), *Euastrum Floridanum* (Fla.), *E. pseudelegans*, *E. coronatum* (Minn.), *Micrasterias furcata*, var. *decurta* (N. Y.), *M. mamillata* (Pa.), *M. Americana*, var. *spinosa* (Nova Scotia), *M. denticulata*, var. *Minnesotensis* (Minn.), *M. papillifera*, var. *Novæ Scoticæ* (N. S.), *Arthrodesmus incus*, var. *Americana* (Pa.), *Xanthidium armatum*, vars. *Wolleanum* and *Americanum*, (N. J.), *Staurastrum gladiosum* (N. J.), *S. Pringsheimii*, var. *duplo-majus*, (N. S.), *Docĭdium occidentale*, and *Gonatozygon sex-spiniferum* (Minn.). The descriptions of the above are accompanied with two plates of figures.

The following are given as new to North America: *Cosmarium Cordanum*, Brêb. (N. S.), *Staurastrum dejectum*, Brêb., var. *Sudeticum*, Kirch. (Minn.), and *Penium spirostriolatum*, Barker (Minn.)

The Fruit of Opuntia.—At the meeting of the Philadelphia Academy of Natural Sciences, August 11th, Mr. Thomas Meehan exhibited a series of specimens of an unknown species of *Opuntia* closely allied to *O. Brasiliensis* and showing a gradual change from the joint or frond to the fruit. In one case there was the thin orbicular frond, then a frond with a slight rounding and tapering at the base, then one somewhat resembling a fruit, but very much compressed, and with an abortive flower-bud having a scar at the apex, then another with a perfect flower, but very much elongated and fluted, but with a perfect flower, though small, and lastly the frond reduced to an inch in length, pyriform, and with the perfect large yellow flower. He remarked that it could not be called a novel point to make that the fruit of a *Cactus* was simply a metamorphosed frond, or joint as the section is commonly called, and that the petals were the usually very much suppressed leaves, but it might serve a good purpose to place on record this excellent illustration of the fact.

A deep-water Moss.—Fishermen who capture the char off Yvoire Point on the southern shore of Lake Leman, says *La Nature*, often bring up in their nets fragments of rocks upon which is frequently found growing a moss of a beautiful green color. These stones, according to the distinguished naturalist Mr. J. B. Schnetzler, and to Prof. Bocion of the Industrial School of Lausanne, come from a depth of 200 feet. No stream of water enters the lake in this region, and the rock, with adhering moss, is found at a great distance from the shore. No moss has hitherto been found living at so great a depth. The fact is the more striking in that the cells of the species under consideration are filled with chlorophyll, a coloring matter which, save rare exceptions, can be developed only under the influence of light of a certain intensity.

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* LEPTOZOSMA, *n. gen.*—Filamentous, long, cateniform; not twisted or but slightly so. Joints united by a strongly marked suture; cells attenuate at the ends towards the suture. Near to *Bambusina*, but differing in the suture.

Botanical Literature.

Manual of the Botany (Phænogamia and Pteridophyta) of the Rocky Mountain Regions, from New Mexico to the British Boundary. By John M. Coulter, Ph.D. Ivison, Blakeman, Taylor & Co.: New York and Chicago. 1885.

This book will be gladly welcomed by western botanists, as well as by those of their eastern confreres who have had occasion to identify western plants, and who know by experience how difficult it often is to obtain access to descriptions. The range of the work includes Colorado, Wyoming, Montana, Western Dakota, Western Nebraska and Western Kansas, the eastern boundary being very nearly represented by the hundredth meridian. The greater portion of contiguous floras is also described, so that "the western part of the Indian Territory, Northwestern Texas, Northern New Mexico and Arizona, and Eastern Utah and Idaho may be included for all except their own peculiar plants." This is a very wide range and embraces one of three regions west of the Mississippi Valley prairie country that possess well defined floras, the others being that of the Pacific slope, which is provided for in the Botany of California, and that which extends from the Great Basin to Arizona, New Mexico, Western Texas, and southward into Mexico, and which is found described partly in Mr. Watson's Botany of the Fortieth Parallel and partly in Dr. Rothrock's Botany of the Wheeler Survey.

As a general thing, Prof. Coulter follows the sequence of orders adopted by Bentham and Hooker, but he has transferred Gymnosperms to the end of Phænogams, and has subordinated Monocotyledons and Dicotyledons to Angiosperms, as this, he remarks, better expresses relationships that have long been recognized. The old term "Cryptogam" has been discarded for that of Pteridophyta, and the classes and orders have been arranged under this series in that sequence which the author thinks best expresses relationships.

The descriptions of adventive plants are in all cases printed in smaller type and placed at the bottom of the page.

In size, typography and general make up, the book is uniform with Dr. Gray's Manual. In view of the want that has long existed for a concise account of the flora of the Rocky Mountain region, in a convenient form for reference, we bespeak for Prof. Coulter's work a large sale.

Les Procédés operatoires en Histologie Végétale; Guide pour les Etudes de Microchimie. Par Louis Olivier. Paris: Savy. 1855.

In this volume, Mr. Olivier has brought together in systematic order, from various scattered papers, descriptions of the most approved methods of preparing microchemical reagents, and the mode of applying them to the study of plants. After pointing out how great a light is shed upon the minute anatomy of the tissues by the microchemical method, the author discusses the form, the structure, the contractility,